

CERTIFICATE OF VERIFICATION

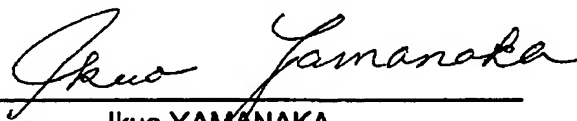
I, Ikuo YAMANAKA

of c/o YAMANAKA, TANAKA & ASSOCIATES, 7th Floor, Daiei Building, 11-20, Nishiki
1-chome, Naka-ku, Nagoya-shi, Aichi-ken 460-0003 Japan

state that the attached document is a true and complete translation to the best of my
knowledge of the Certified Copy of Japanese Patent Application No. 2003-003769.

Dated this 30th day of November, 2007

Signature of Translator:


Ikuo YAMANAKA

2003-003769

【Title of Document】 Patent Application
【Reference No.】 P02-0802
【Submission Date】 January 9, 2003
【Addressed to】 Commissioner, Japan Patent Office
【International Patent Classification】 A63F 5/04 512
【Inventor】
【Address】 Ariake Frontier Building A, 3-1-25, Ariake, Koto-ku, Tokyo
【Name】 Kazuo OKADA
【Patent Applicant】
【Identification No.】 598098526
【Name】 ARUZE Corp.
【Administrator】
【Identification No.】 100106002
【Patent Attorney】
【Name】 Masayuki SHOBAYASHI
【Indication of Fees】
【Advance Payment Book Number】 058975
【Amount Paid】 21,000 Yen
【List of Attached Document】
【Title of Document】 Specification 1
【Title of Document】 Abstract 1
【Title of Document】 Drawings 1
【General Power of Attorney No.】 0018505
【Necessity of Proof】 Yes

2003-003769

【Document Name】 specification
【Title of the Invention】 GAMING MACHINE
【Claims】

【claim 1】 A gaming machine comprising a cabinet, a plurality of rotation reels on a surface of each of which symbols are described, a rotation control circuit board for controlling rotation of each of the rotation reels and a main control circuit board for wholly controlling the gaming machine,

wherein the rotation reel is held between a drive roller or a drive pinion and a following roller or a following pinion at an edge portion thereof, the drive roller or the drive pinion and the following roller or the following pinion being contacted from an outer periphery direction and an inner periphery direction, respectively, thereby the reel is made rotatable by a drive force of the drive roller or the drive pinion,

wherein the drive roller or the drive pinion is connected to a motor for driving the following roller or the following pinion, and

wherein the motor is arranged in an upper position of the rotation reels.

【claim 2】 The gaming machine according to claim 1, wherein the rotation control circuit board controls rotation of the motor and is arranged with the motor in the upper position of the rotation reels.

【Detailed Description of the Invention】

【0001】

The present invention relates to a gaming machine.

【Field of the Invention】

【0002】

【Prior Arts】

In a gaming machine such as so-called Japanese pachislot machine, slot machine, a plurality of reels (usually three reels) are rotatably arranged in a cabinet, and the reels start to rotate at the same time that a game is started. Further, when all reels stop, a game result is determined based on an arranging state of symbols which are described on an outer periphery of each reel.

【0003】

Therefore, bringing game contents in the above gaming machine into focus, it is no exaggeration to say that the moving state of the reels is the most important point for a player.

2003-003769

【0004】

In general reel drive method of the previous gaming machine, a rotation axis of the reel and a drive motor are connected with each other. And the rotation axis of the reel is rotated by the drive motor, thereby the reel is rotated.

【0005】

Here, all gaming machines does not have the above mentioned reel drive mechanism, and it is also proposed a gaming machine which has construction that the reels are driven to rotate at the outer peripheral portion thereof (for example, see Patent Reference 1 and Patent Reference 2).

【0006】

【Patent Reference 1】

Japanese Unexamined Patent Application No. 10-33749

【Patent Reference 2】

Japanese Unexamined Patent Application No. 2001-132915

【0007】

【Problem to be Solved by the Invention】

In the conventional gaming machine in which the reels are driven at the rotation axis thereof, there exists a problem due to its construction.

【0008】

First, in the above mentioned reel construction, the reel has an outer portion which is formed in a strip like shape to display various symbols thereon and spokes to fix the outer portion to a rotation axis thereof only exist in an inner side. Therefore, the reel has the construction that mass of the reel is concentrated to the outer portion. Due to this, in the reel having such construction, in order to rotate the reel by rotation of the rotation axis, it needs very large torque when the reel is driven to rotate. And also when the reel is stopped, moment of inertia of the reel becomes very large due to its rotation, therefore very large power is necessary to stop the reel. Thus, rotation control of the reel is very difficult.

【0009】

Second, the main control circuit board for wholly controlling the gaming machine is generally arranged in the rear upper position in the gaming machine, and the rotation control circuit board for controlling rotation of the reels is generally arranged in the side position of the reels. Further, since the motor for rotating each of the reels is arranged

2003-003769

within each reel, wiring for mutually connecting each of the main control circuit board, the rotation control circuit board and the motors becomes very long and very complexed.

【0010】

And third, since the construction in which each reel and the motor and the other parts arranged around the reels are arranged, becomes very complexed, it is required many processes for mutually assembling them and there is lack in consideration for recycle of the gaming machine, the recycle of products becoming important in recent years.

【0011】

Concerning with the gaming machines disclosed in both the above Patent References 1 and 2, it is not proposed to dissolve the above problems. In these gaming machine, when the reel is started to rotate, rotation force is obtained by the drive roller or the drive pinion on the outer periphery portion. Therefore, although the reel can be started to rotate with less torque in comparison with the conventional gaming machine, it is also difficult to stop the reel at the desirable position.

【0012】

In order to stop the reel by stopping the drive motor, enough frictional force has to be acted between the drive roller and the reel to realize this function, and the drive roller has to be arranged so as to give enough force toward a normal line direction in the contact surface where the drive roller and the reel contacts with each other. At that time, it is necessary that the reel can resist the force given from the drive roller without distortion.

【0013】

Accordingly, the reel in the gaming machine must have a strong construction so as not distort by the force acted on the reel surface.

【0014】

And as for the second and third problems, there exists no consideration in both Patent References 1 and 2.

【0015】

The present invention has been done to dissolve the above problems and has an object to provide a gaming machine in which stop position of the reel can be easily controlled and which has a construction that wiring in the gaming machine can be simplified.

2003-003769

【0016】

【Means for Solving the Problem】

In order to accomplish the above object, in the gaming machine of the present invention, the reel is directly driven at the outer periphery thereof and the motor and the rotation control circuit board are intensively arranged.

【0017】

Concretely, the present invention provides a gaming machine as follows.

【0018】

(1) A gaming machine comprising a cabinet, a plurality of rotation reels on a surface of each of which symbols are described, a rotation control circuit board for controlling rotation of each of the rotation reels and a main control circuit board for wholly controlling the gaming machine,

wherein the rotation reel is held between a drive roller or a drive pinion and a following roller or a following pinion at an edge portion thereof, the drive roller or the drive pinion and the following roller or the following pinion being contacted from an outer periphery direction and an inner periphery direction, respectively, thereby the reel is made rotatable by a drive force of the drive roller or the drive pinion,

wherein the drive roller or the drive pinion is connected to a motor for driving the following roller or the following pinion, and

wherein the motor is arranged in an upper position of the rotation reels.

【0019】

According to the invention (1) mentioned above, in the gaming machine with a plurality of reels, the rotation reel is held between a drive roller or a drive pinion and a following roller or a following pinion at an edge portion thereof, the drive roller or the drive pinion and the following roller or the following pinion being contacted from an outer periphery direction and an inner periphery direction, respectively, thereby the reel is made rotatable by a drive force of the drive roller or the drive pinion, and the drive roller or the drive pinion is connected to a motor for driving the following roller or the following pinion, and the motor is arranged in an upper position of the rotation reels. According this construction, direct stop control of the rotation reel can be easily done.

【0020】

Here, in many of the previous gaming machines with plural rotatable reels such as Japanese pachislot machines, each reel is rotated by the motor a drive shaft of which

2003-003769

is directly connected to the rotation axis portion of the reel, therefore moment of inertia of the reel becomes large while rotating. Thus, it is difficult to brake and stop rotation of the reel at the predetermined position. And in the gaming machine in which the reel is directly driven to rotate at the outer periphery of the reel, since driving force is transmitted to the reel by contacting the drive roller to the reel along one direction, rotational energy of the reel has to be caught at one portion when the reel stops. Therefore, it is difficult to brake and stop the reel at the predetermined position.

【0021】

Taking the above situation into consideration, in the gaming machine according to the invention, since it is constructed so as to hold the side edge portion of the reel between the drive roller and the following roller, stop control of the reel can be easily done by the drive roller and the following roller. Thereby, direct stop control of the reel can be easily and precisely conducted

【0022】

Further, since the side edge of the reel is held by the drive roller and the following roller, pressure exerted from the drive roller to the reel is canceled by pressure exerted from the following roller to the reel, there is no need that the reel is strongly constructed. Thereby, cost of the reel can be reduced, as a result, total cost of the gaming machine can be also reduced.

【0023】

Further, since the motor is not connected within the inner side of the rotation reel and complexed wiring does not need, the rotation reel can be easily removed and the number of processes at recycle of the gaming machine can be reduced.

【0024】

(2) the gaming machine according to the gaming machine (1), wherein the rotation control circuit board controls rotation of the motor and is arranged with the motor in the upper position of the rotation reels.

【0025】

According to the invention (2), in the gaming machine (1), the rotation control circuit board controls rotation of the motor and is arranged with the motor in the upper position of the rotation reels. According to this construction, both the motor and the rotation control circuit board, and both the rotation control circuit board and the main control circuit board, are arranged at the close position with each other, thereby wiring

2003-003769

thereof become very simple, and design and assembly thereof can be easily done.

【0026】

In the conventional gaming machine, the motor is arranged within the reel, the rotation control circuit board is arranged at the side position of the rotation reel and the main control circuit board is arranged in the rear upper position within the cabinet. Therefore, since these parts are distantly arranged with each other, wiring thereof becomes very complexed.

【0027】

By constructing the gaming machine according to the present invention, the motor and the rotation circuit board, or the rotation control circuit board and the main control circuit board can be exchanged with one-piece construction, thus the gaming machine can be easily changed to the slot machine in which different games are conducted, by recycling.

【0028】**【Preferred Embodiments】**

Hereinafter, a gaming machine according to the present invention will be described based on the embodiment embodying the present invention, with reference to the drawings. Here, in the embodiment, though the gaming machine of the present invention is realized in a so-called Japanese pachislot machine and description thereof will be done, the present invention can be applied to any types of gaming machines such as slot machines which have mechanically reels. And though any types of game media such as coins, medals, tokens can be utilized in the gaming machine, it will be described the gaming machine in which coins are used as the game medium.

【0029】**[CONSTRUCTION OF THE GAMING MACHINE]**

The basic construction of the gaming machine 10 is shown in Fig. 1.

【0030】

In front of a cabinet 12 forming an outline of the gaming machine 10, there are arranged three display windows 14 (14L, 14C, 14R) each of which is formed into a longitudinally lengthy rectangular shape substantially positioned vertically. And on the display windows 14L, 14C, 14R, there are arranged five pay lines which comprise horizontal three pay lines (center pay line L1, upper pay line L2A, bottom pay line L2B) and oblique two pay lines (pay line L3A the right end of which is directed downward, pay

2003-003769

line L3B the right end of which is directed upward). At the both ends (right end and left end) of each pay line L1, L2A, L2B, L3A, L3B, there are arranged bet number display parts 16 which display pay lines (suitably abbreviated as effective lines) which become effective according to the number of inserted coins in the gaming machine 10 and the coin number betted. Concretely, the bet number display parts 16 is arranged such as "3," "2," "1," "2," "3," in order from the uppermost part.

[0031]

When a player presses a 1-BET switch 20 (mentioned later), one pay line among five pay lines, for example, the pay line L1 is made effective. When the player presses a 2-BET switch 22 (mentioned later), three pay lines among five pay lines, for example, the pay lines L1, L2A and L2B are made effective. And when the player presses a MAX-BET switch 24 (mentioned later), all pay lines of five pay lines, that is, the pay lines L1, L2A, L2B, L3A and L3B are made effective. The effective pay line is brightly indicated by lightening an effective line display lamp 18 (see Fig. 6, mentioned later) which is arranged behind the bet number display part 16.

[0032]

In the cabinet 12, three reels 26 (26L, 26C, 26R) are rotatably arranged. On each outer periphery of the reels 26, a plurality of symbols are described. Each reel 26L, 26C, 26R can be seen through the display windows 14L, 14C, 14R, respectively. As mentioned later, the reel 26L, 26C, 26R is driven to rotate so that the symbols described on the outer periphery of the reel 26L, 26C, 26R are moved from upper side toward lower side in the display window 14L, 14C, 14R.

[0033]

Further, at lower position of the display windows 14L, 14C, 14R, a frontward projection portion 28 is horizontally formed. In the center of the frontward projection portion 28, a display device 30 constructed from a liquid crystal display panel is arranged. On the display device 30 game histories are displayed and image direction in bonus games is conducted.

[0034]

At the right side of the display device 30, a coin insertion slot 32 through which coins are inserted in the gaming machine 10 is formed.

[0035]

At the left side of the display device 30, the 1-BET switch 20, the 2-BET switch 22

2003-003769

and the MAX-BET switch 24 are provided. Here, the 1-BET switch 20 acts to bet in one game only one coin among coins already inserted in the gaming machine 10 when operated. The 2-BET switch 22 acts to bet in one game two coins among coins already inserted in the gaming machine 10 when operated. And the MAX-BET switch 24 acts to bet the maximum number of coins capable of betting in one game among coins already inserted in the gaming machine 10. When the BET switch 20, 22 or 24 is pressed, the above mentioned pay lines are made effective according to the depressed BET switch.

【0036】

At the left side of the front surface of the frontward projection portion 28, a start lever 34 is provided so as to be able to obliquely move. Based on that the player operates the start lever 34 which is obliquely moved, rotation of three reels 26L, 26C, 26R is started. While three reels 26L, 26C, 26R are rotated, symbols described on each outer periphery of the reels 26L, 26C, 26R are variably displayed within the display windows 14L, 14C, 14R.

【0037】

And when rotational velocity of the reels 26L, 26C, 26R reaches to a constant velocity, stop buttons 36 (36L, 36C, 36R, mentioned later) become effective for operation by the player.

【0038】

At the center of the front surface of the frontward projection portion 28, three stop buttons 36L, 36C and 36R are provided. Here, the stop button 36L corresponds to the reel 26L, the stop button 36C corresponds to the reel 26C and the stop button 36R corresponds to the reel 26R. When the player presses the stop button 36L the reel 26L stops, and when the player presses the stop button 36C the reel 26C stops. Similarly, when the player presses the stop button 36R the reel 26R stops.

【0039】

And when the reels 26L, 26C, 26R stop, symbols described on each outer periphery of the reels 26L, 26C, 26R are controlled to stop at positions corresponding to pay lines L1, L2A, L2B, L3A and L3B

【0040】

At the left side of the start lever 34, a payout button 38 is arranged. When the player presses the payout button 38, coins inserted in the gaming machine 10 are paid out from a coin payout opening 40 positioned at the front lower position of the cabinet 12

2003-003769

and the paid out coins are accumulated in a coin tray 42.

【0041】

At the upper side of the coin tray 42, a pair of speaker grills 46 are provided so that sounds produced by speakers 44 (see Fig. 3) installed in the cabinet 12 are spread out of the cabinet 12.

【0042】

An enlarged front view of the display windows 14L, 14C, 14R of the gaming machine 10 and reels 26 (26L, 26C, 26R) is shown in Fig. 2. In Fig. 2, it is shown a state that the reel 26L stops and both of the reel 26C and 26R are rotating. Here, in fact, since it is difficult to express the rotating state of the reels 26C, 26R, the reels 26C and 26R are expressed as if being rotated.

【0043】

As mentioned in the above, the reels 26L, 26C and 26R are respectively arranged behind the display windows 14L, 14C and 14R, and three symbols among symbols described on each outer periphery of the reels 26 can be seen at the same time through each of the display windows 14L, 14C and 14R.

【0044】

At the front part of the display windows 14L, 14C and 14R, five pay lines of L1, L2A, L2B, L3A and L3B are provided, and three symbols among symbols described on each outer periphery of the reels 26L, 26C and 26R stop on the pay lines. Further, a game result is determined based on a combination state of three symbols arranged on each of the pay lines.

【0045】

It is shown in Fig. 3 a state that a front door 48 of the gaming machine 10 is opened leftward.

【0046】

At the lower position of the rear side in the front door 48, speakers 44 are arranged so as to position to the rear sides of the speaker grills 46 (see Fig. 1).

【0047】

At the rear upper position in the gaming machine 10, a main control circuit unit 100 is arranged, the main control circuit unit 100 entirely controlling the gaming machine 10 and games conducted therein. And a rotation control circuit unit 150 for controlling rotation of the reels 26L, 26C and 26R is arranged at the upper position of

2003-003769

the reels 26L, 26C, and 26R.

【0048】

At the lower position of the cabinet 12, a hopper 50 is also arranged. The hopper 50 accumulates coins inserted by the player and pays out coins to the player based on the game result.

【0049】

In Fig. 4, it is shown the sectional view of the upper part in the gaming machine 10 sectioned along A-A' line in Fig. 3.

【0050】

In Figs. 4 and 5, at the rear upper position in the cabinet 12, a circuit board installing the main control circuit unit 100 for entirely controlling the gaming machine 10 and games is provided.

【0051】

And at a position upper than the reel 26 (26C) and near the main control circuit unit 100, the rotation control circuit unit 150 for controlling rotation of the reels 26 is provided.

【0052】

Further, a drive roller 52 (52C) for rotating the reel 26 is contacted to the reel 26 between the reel 26 and the rotation control circuit board 150. And the drive roller 52 is rotated by a stepping motor 54 (54C) (see Fig. 1) which is driven by a signal output from a motor drive circuit 154 (see Fig. 6) installed in the rotation control circuit board 150, and the reel 26 is rotated by rotation force of the drive roller 52 transmitted thereto.

【0053】

Further, a following roller 56 (56C) is contacted to the inner side of the reel 26 at a portion that the drive roller 52 is contacted so that the following roller 56 sandwiches the reel 26 with the drive roller 52.

【0054】

And each of the reels 26 is rotatably arranged around a axis portion 60, which acts as the rotation axis of each reel 26 and supported within each reel 26 by plural spokes 58 (58C) (four spokes 58 in this embodiment).

【0055】

And a reel light 62 (62C) is provided at the forward position within the reel 26C. The reel light 62 irradiates from the backside of the portion which is visible through the

2003-003769

display window 14 in the surface of the reel 26, thereby the reel 26 is brightened. Further, various directions can be done by turning on and off the reel light 62 according to the game condition.

【0056】

It is shown in Fig. 5 a schematic sectional view sectioned by B-B' dotted line in Fig. 4.

【0057】

And the stepping motors 54L, 54C, 54R for rotating the reel 26L, 26C, 26R respectively, are connected to the rotation control circuit unit 150. The stepping motors 54L, 54C, 54R, as mentioned, transmit driving force to the drive rollers 52, respectively. Thereby, based on that the drive rollers 52 are rotated, the reels 26 are rotated.

【0058】

According to the construction mentioned above, the stepping motors 54, the drive rollers 52L, 52C, 52R and the following rollers 56 are suspended from the upper position of the reels 26 and the stepping motors 54 are electrically connected to the rotation control circuit unit 150.

【0059】

As mentioned, in the gaming machine, the rotation reel is held between a drive roller or a drive pinion and a following roller or a following pinion at an edge portion thereof, the drive roller or the drive pinion and the following roller or the following pinion being contacted from an outer periphery direction and an inner periphery direction, respectively, thereby the reel is made rotatable by a drive force of the drive roller or the drive pinion, and the drive roller or the drive pinion is connected to a motor for driving the following roller or the following pinion, and the motor is arranged in an upper position of the rotation reels. Thereby, direct stop control of the rotation reel can be easily done.

【0060】

Here, in the embodiment, although the rotation control circuit board 150 is arranged in the upper position of the reels and near the main control circuit board, it is not necessary to arrange the rotation control circuit board at the mentioned position in order to obtain the above effect in the present invention. The rotation control circuit board may be arranged at any position within the cabinet 2.

【0061】

2003-003769

And as mentioned, by arranging the rotation control circuit board 150 in the upper position of the reel and near the main control circuit board, it concludes that the rotation control circuit board controls rotation of the motor and is arranged with the motor in the upper position of the rotation reels. Therefore, both the motor and the rotation control circuit board and both the rotation control circuit board and the main control circuit board are closely arranged with each other, thereby wiring can be simplified, and design and assemble can be easily done.

【0062】

Further, in the above embodiment, though the reel 26 is held between the drive roller 52 and the following roller 56 and is rotated by rotation of the drive roller 52, it is not limited to the above construction. The reel 26 may be rotated by another members such as a drive pinion and a following pinion.

【0063】

[CONSTRUCTION OF CONTROL DEVICE FOR GAMING MACHINE]

It is shown in Fig. 6 the block diagram of circuitry including the control circuit for controlling the gaming machine 10 and the peripheral devices connected to the control circuit.

【0064】

The start lever 34 is connected to an interface circuit group 102 of the main control circuit unit 100, and the interface circuit group 102 is connected to an input and output bus 104. Start signal for starting the game produced by the start lever 34 is converted into desired signal in the interface circuit group 102, thereafter the converted signal is provided to the input and output bus 104. The input and output bus 104 is constructed so that data signal or address signal is input to and output from a central processing unit (abbreviated as CPU hereinafter) 106.

【0065】

And the stop buttons 36L, 36C, 36R, the 1-BET switch 20, the 2-BET switch 22, the MAX-BET switch 24 and the payout button 38 are also connected to the interface circuit group 102. Signals produced by pushing these buttons or switches are also provided to the interface circuit group 102 and converted into desired signals, thereafter the converted signals are provided to the input and output bus 104.

【0066】

Further, the coin detector 64 is connected to the interface circuit group 102.

2003-003769

Signal produced by the coin detector 64 is also input to the interface circuit group 102 and converted into desired signal, thereafter the converted signal is input to the input and output bus 104.

【0067】

To the above input and output bus 104, a ROM (Read Only Memory) 108 and a RAM (Random Access Memory) 110 are also connected. The ROM 108 stores control program for wholly controlling game flow conducted in the gaming machine 10. Further, the ROM 108 stores initial data for executing the control program, character data for displaying messages on the display device 30 and sound data for sounding various sounds from the speakers 44.

【0068】

The RAM 110 temporarily stores flag data and variable values utilized in the control program.

【0069】

A random number generator 112 for generating random numbers is connected to the input and output bus 104. The random number generator 112 randomly generates numbers within a predetermined range. For example, the random number generator 112 generates random numbers within a range of 0~65535 (corresponding to 2^{16}). Here, in the embodiment, though the random numbers are generated by the random number generator 112 arranged out of the CPU 106, the present invention is not limited to this construction. For example, the random numbers may be generated by processing treatment of the CPU 106 without forming the random number generator.

【0070】

A flash memory 114 is also connected to the input and output bus 104 and the flash memory 114 stores a flag number indicating that rights for migrating to BIG BONUS game or REGULAR BONUS game are obtained. Here, in the embodiment, though the above flag number is stored in the flash memory 114, the present invention is not limited to this. It may be used any type of nonvolatile memories such as a hard disc drive capable of rewriting data.

【0071】

A communicating interface circuit 116 is also connected to the input and output bus 104. The communicating interface circuit 116 can transmit game state data to and communicate with a server for controlling the gaming machines installed in a game

2003-003769

arcade.

【0072】

Further, a reel control circuit 152 formed on the rotation control circuit unit 150 is connected to the input and output bus 104. The reel control circuit 152 controls each of the reels 26L, 26C, 26R.

【0073】

Further, a motor driving circuit 154 is connected to the reel control circuit 152. And when the reel control circuit 152 receives commands to rotate the reels 26 or stop rotation of the reels 26 from the CPU 106, the reel control circuit 152 transmits command signals for controlling the reels 26 to the motor driving circuit 154, so as to suitably execute contents corresponding to the commands.

【0074】

Further, the stepping motors 54L, 54C, 54R, each of which rotates the reel 26L, 26C, 26R, respectively, are connected to the motor driving circuit 154. Each of the stepping motor 54L, 54C, 54R is arranged at the upper position of each of the reel 26L, 26C, 26R, respectively. Here, both the stepping motors 54L, 54C, 54C and the drive rollers 52L, 52C, 52R are positioned so that each drive shaft 157 of the stepping motors 54L, 54C, 54R coincides with each rotational center of the drive rollers 52L, 52C, 52R. And each of the drive rollers 52L, 52C, 52R is positioned so as to contact to each of the outer periphery of the reels 26L, 26C, 26R. Thus, each rotating force of the drive rollers 52L, 52C, 52R is transmitted to each of the reels 26L, 26C, 26R, thereby the reels 26L, 26C, 26R are rotated.

【0075】

Drive control command produced in the CPU 106 is converted into drive signal by the motor driving circuit 154 and this drive signal is provided to the stepping motors 54L, 54C, 54R. Here, the drive control command includes rotational velocity command, therefore not only rotational control and stop control of the stepping motors 54L, 54C, 54R but also rotational velocity control thereof are conducted based on the drive control command.

【0076】

As mentioned, based on that the CPU 106 controls the stepping motors 54L, 54C, 54R, not only rotational control and stop control of the stepping motors 54L, 54C, 54R but also rotational velocity control thereof can be done.

2003-003769

【0077】

To each of the reels 26L, 26C, 26R, rotational angle position sensor 156L, 156C, 156R, each of which senses rotational angle of the reel 26L, 26C, 26R, is attached. And the rotational angle position sensors 156L, 156C, 156R are connected to a reel rotational angle position detecting circuit 158 which is formed on the rotation control circuit unit 150. When signal indicating the rotational angle position of each reel 26L, 26C, 26R is output from the rotational angle position sensor 156L, 156C, 156R, this signal is input to the reel rotational angle position detecting device 158 and converted into predetermined signal, thereafter the converted signal is provided to the input and output bus 104 through the reel control circuit 152.

【0078】

The CPU 106 computes symbol code Nos. based on the provided rotational angle position information, thereby it can be specified symbol images which are displayed within the display windows 14L, 14C, 14R.

【0079】

Further, to the input and output bus 104, it is connected a sub-control unit 200 for controlling parts to inform the player of various information, such as the display device 30, the speaker 44, the effective line display lamp 18, stop button lamps 72L, 72C, 72R, the reel lights 62L, 62C, 62R. The sub-control unit will be described hereinafter.

【0080】

And further, a hopper driving circuit 250 is connected to the input and output bus 104, and when the CPU 106 receives signal indicating that the payout button 38 is pressed or coins have to be paid out based on that the player wins a prize in the game, the CPU 106 sends coin payout signal to the hopper driving circuit 250. Thereby, the hopper driving circuit 250 drives the hopper 50 and coins are paid out corresponding to the prize.

【0081】

The block diagram of the sub-control unit 200 is shown in Fig. 7

【0082】

In Fig. 7, an interface circuit 202 is connected to an input and output bus 204, and image display command output from the main control circuit unit 100 is provided to the input and output bus 204 through the interface circuit 202. Data signal and address signal are input and output between the input and output bus 204 and a CPU

2003-003769

206.

【0083】

To the mentioned input and output bus 204, a ROM 208 and a RAM 201 are also connected. The ROM 208 stores display control program for producing drive signal provided to the display device 30 based on image display command output from the main control circuit unit 100. And the RAM 201 stores flags and variable values, which are used in the display control program.

【0084】

Further, a video data processor (abbreviated VDP hereinafter) 212 is connected to the input and output bus 204. The VDP 212 includes, so-called, the sprite circuit, the screen circuit and the pallet circuit, and executes various treatment to display images on the display device 30.

【0085】

To the above VDP 212, a video RAM 214 for storing image data corresponding to the image display command output from the main control circuit unit 100, a video data ROM 216 for storing various image data such as image data of symbols, background and characters. Further, a driving circuit 218 for driving the display device 30 is connected to the VDP 212.

【0086】

The CPU 206 reads out the display program stored in the ROM 208 and executes the read out program, and makes the video RAM 214 store the image data displayed on the display device 30 according to the image display command output from the main control circuit unit 100. Here, the image display command includes display command such as background display command, symbol display command, character display command.

【0087】

The video data ROM 216 stores symbol image data used as the identifying information image in the game, character image data including animals and the like displayed when production is done on the display device 30 and background image data comprising background displayed on the display device 30.

【0088】

The symbol image data is utilized when variable displaying and stopping of the symbols are done on the display device 30, and includes image data displayed in various

2003-003769

display manners, for example, such as enlarged images, reduced images, modified images. And the character image data includes image data necessary for displaying a series of moving characters.

【0089】

To the input and output bus 204, a speaker driving circuit 220 for driving the speaker 44 is connected. The CPU 206 reads out the sound data stored in the ROM 208 and provides the read out data to the speaker driving circuit 220. Thereby, predetermined sound is produced by the speaker 44.

【0090】

Further, a lamp driving circuit 222 is also connected to the input and output bus 204. When the CPU 206 receives signal indicating that the 1-BET switch 20, the 2-BET switch 22 or the MAX-BET switch 24 is pressed from the main control circuit unit 100, the CPU 206 send drive command to the lamp driving circuit 222 corresponding to the switch signal output from each switch. Thereby, each of the effective line display lamps 18 is driven to turn on according to the drive command. Sub-control unit 200 may be incorporated in the main control circuit unit.

【0091】

And, according to the game condition, the CPU 206 sends drive command to the lamp driving circuit 222, the drive command used for turning on or off each stop button lamp 72L, 72C, 72R and each reel lamp 62L, 62C, 62R. Thereby, each lamp is turned on or off corresponding to the drive command.

【0092】

Here, the game condition means, for example, a case that the pressing order of three stop buttons 36L, 36C, 36R is serially informed to the player in a special game such as ASSIST TIME controlled by the sub-control unit 200. In this case, in order to inform the next stop button to be pressed by the player among three stop buttons, the stop button lamp provided with the stop button to be pressed and the reel lamp corresponding to the stop button are turned on and remained lamps are turned off. Although described with a gaming machine with stop buttons, the present invention is applicable to those without stop buttons, video slot machines, and the like.

【0093】

The effect described in the specification is merely enumerated as the most suitable effect obtained by the present invention, therefore the effect is, of course, not

2003-003769

limited to the effect described in the specification.

【0094】

【Effects of the Invention】

According to the present invention, in the gaming machine with a plurality of rotation reels, the rotation reel is held between a drive roller or a drive pinion and a following roller or a following pinion at an edge portion thereof, the drive roller or the drive pinion and the following roller or the following pinion being contacted from an outer periphery direction and an inner periphery direction, respectively, thereby the reel is made rotatable by a drive force of the drive roller or the drive pinion, and the drive roller or the drive pinion is connected to a motor for driving the following roller or the following pinion, and the motor is arranged in an upper position of the rotation reels. Therefore, direct stop control of the rotation reel can be easily done.

【0095】

And, it is constructed so that the rotation control circuit board controls rotation of the motor and is arranged with the motor in the upper position of the rotation reels. Thereby, both the motor and the rotation control circuit board and both the rotation control circuit board and the main control circuit board are closely arranged with each other, thereby wiring can be simplified, and design and assemble can be easily done.

【Brief Description of the Drawings】

【Fig. 1】 Fig. 1 is a schematic perspective view of a gaming machine 10 according to the embodiment of the present invention.

【Fig. 2】 Fig. 2 is an enlarged front view of display windows 14 and reels 26 of the gaming machine 10, in which the display windows 14 and the reels 26 are partially enlarged and shown.

【Fig. 3】 Fig. 3 is an explanation view showing a state that a front door 48 of the gaming machine 10 is opened leftward.

【Fig. 4】 Fig. 4 is a A-A' sectional view in Fig. 3.

【Fig. 5】 Fig. 5 is a B-B' sectional view in Fig. 4.

【Fig. 6】 Fig. 6 is a block diagram showing a circuit construction including a main control circuit unit for controlling the gaming machine 10 and peripheral devices electrically connected to the main control circuit unit.

【Fig. 7】 Fig. 7 is a block diagram showing a sub-control unit for controlling a display device 30 and various lamps in the gaming machine 10 and peripheral devices

2003-003769

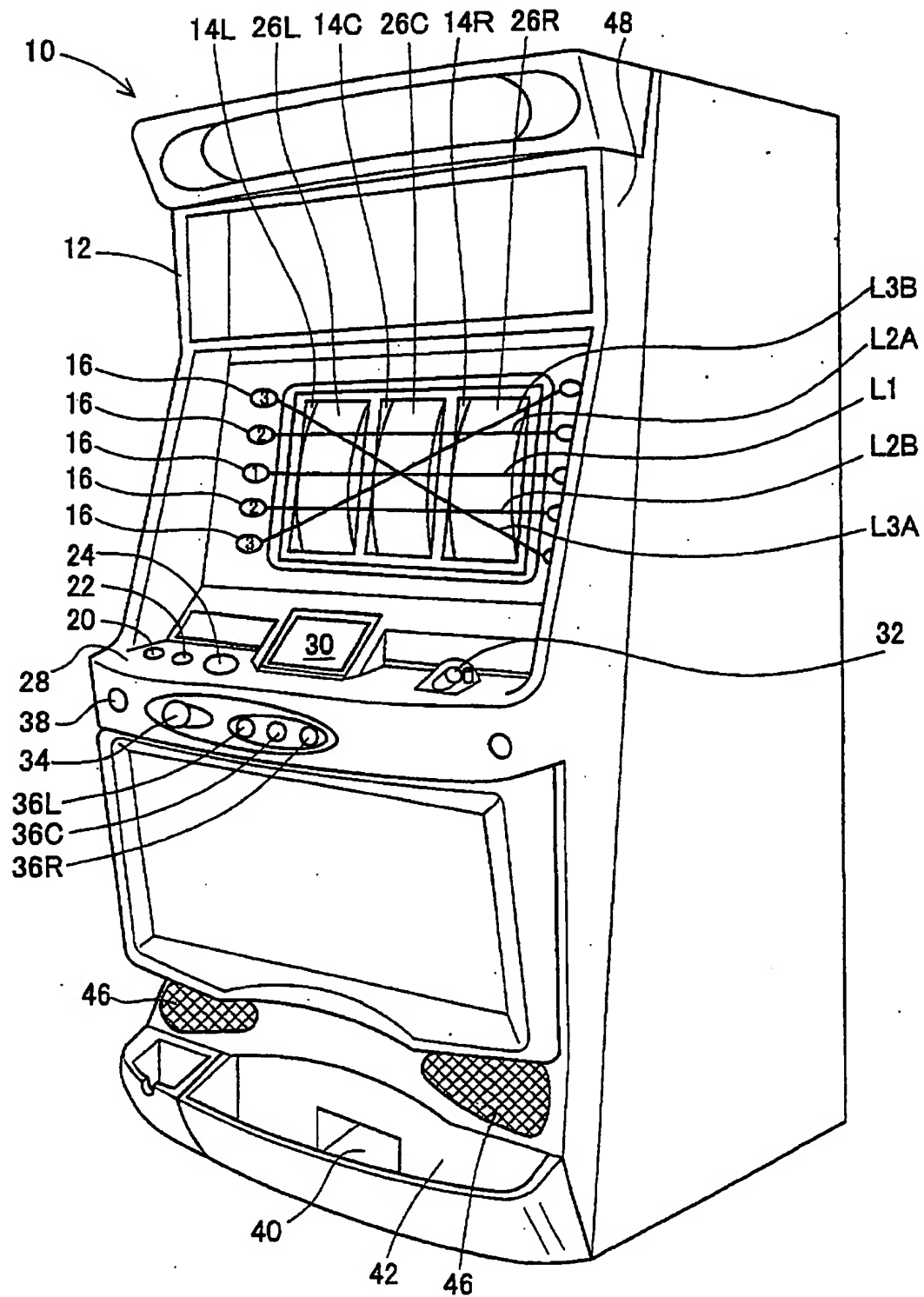
electrically connected to the sub-control unit.

【Explanation of Reference Numeral】

- 10 gaming machine
- 12 cabinet
- 14 (14L, 14C, 13R) display window
- 26 (26L, 26C, 26R) reel
- 30 display device
- 48 front door
- 52 (52L, 52C, 52R) drive roller
- 54 (54L, 54C, 54R) stepping motor
- 56 (56L, 56C, 56R) following roller
- 58 (58L, 58C, 58R) spoke
- 60 reel axis
- 62 (62L, 62C, 62R) reel light
- 100 main control circuit
- 150 rotation control circuit
- 152 reel control circuit
- 154 motor drive circuit
- 156 (156L, 156C, 156R) rotation angle position sensor
- 158 (158L, 158C, 158R) reel rotation angle position detecting sensor
- 200 sub-control unit

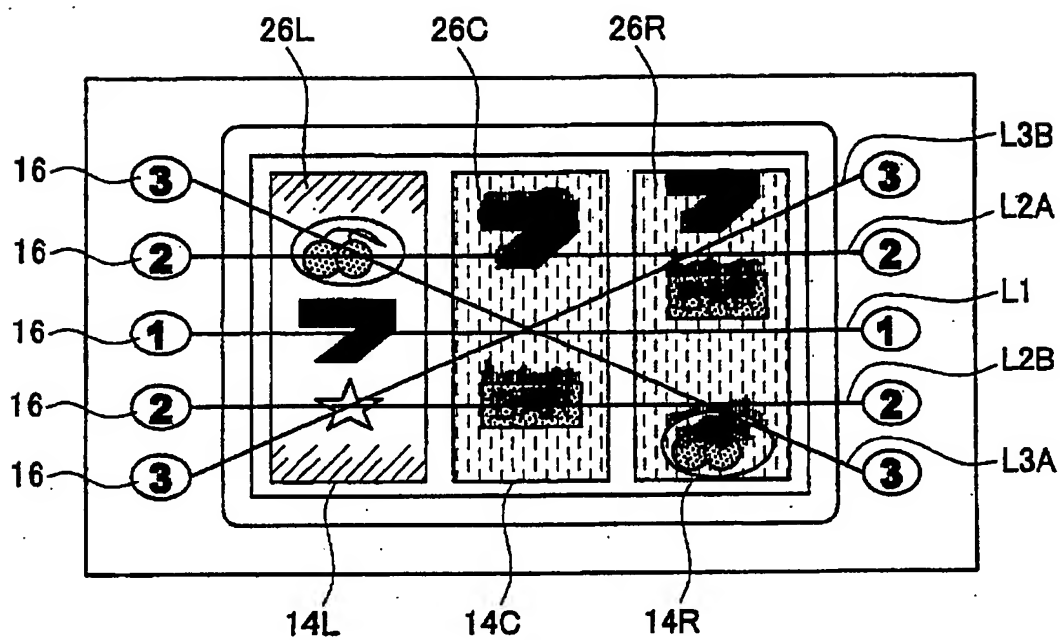
1/7

FIG.1



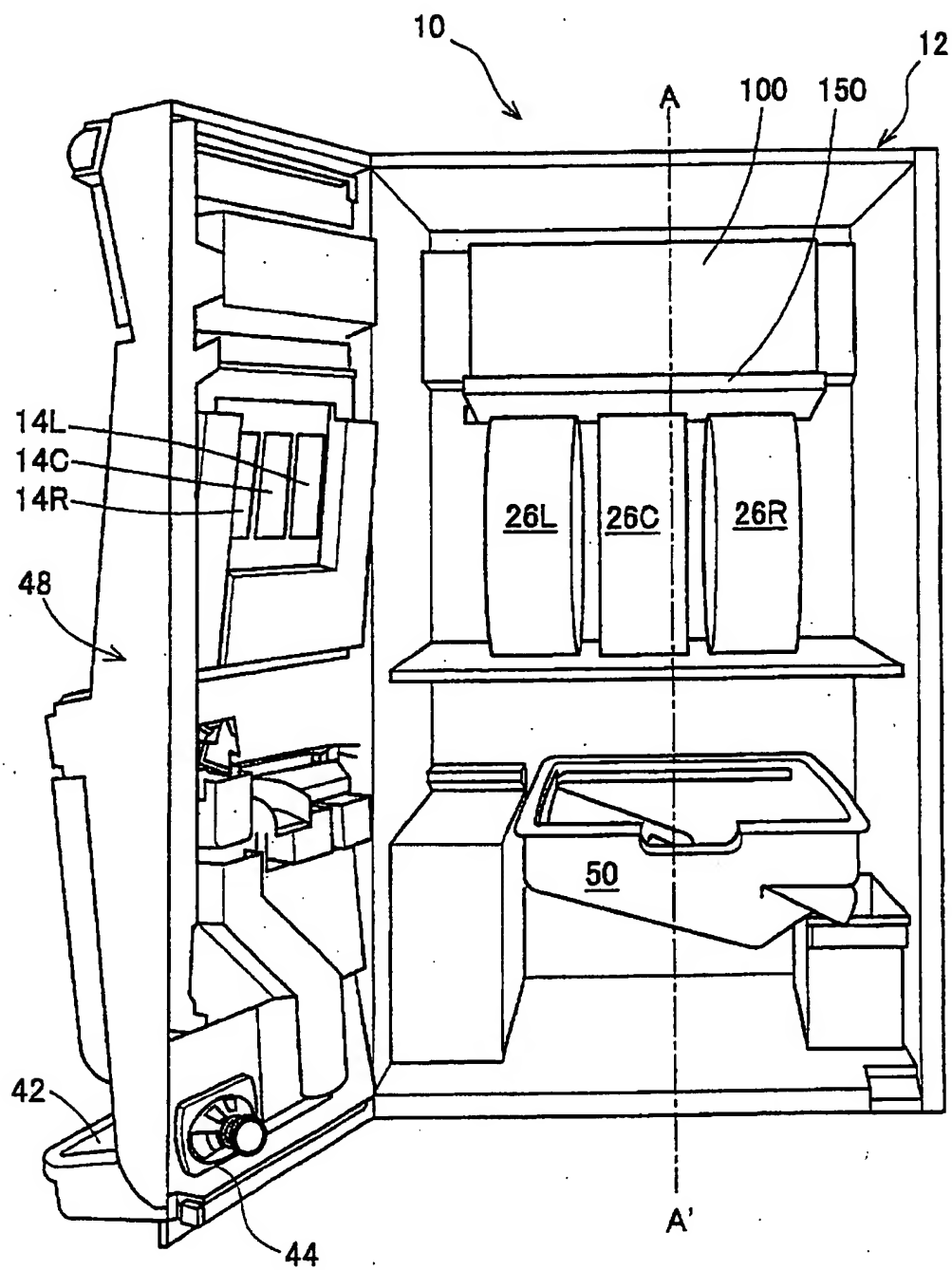
2/7

FIG.2



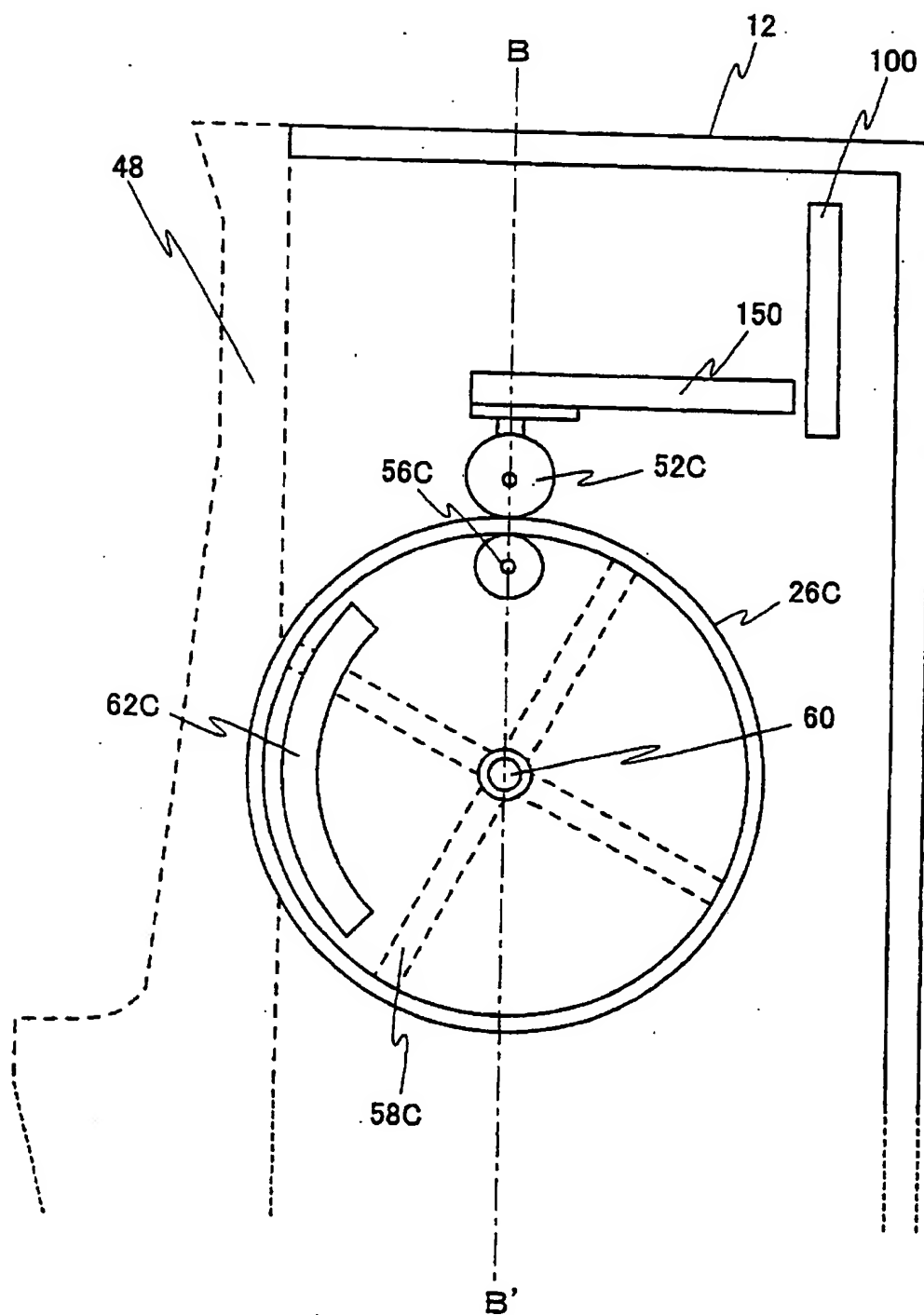
3/7

FIG.3



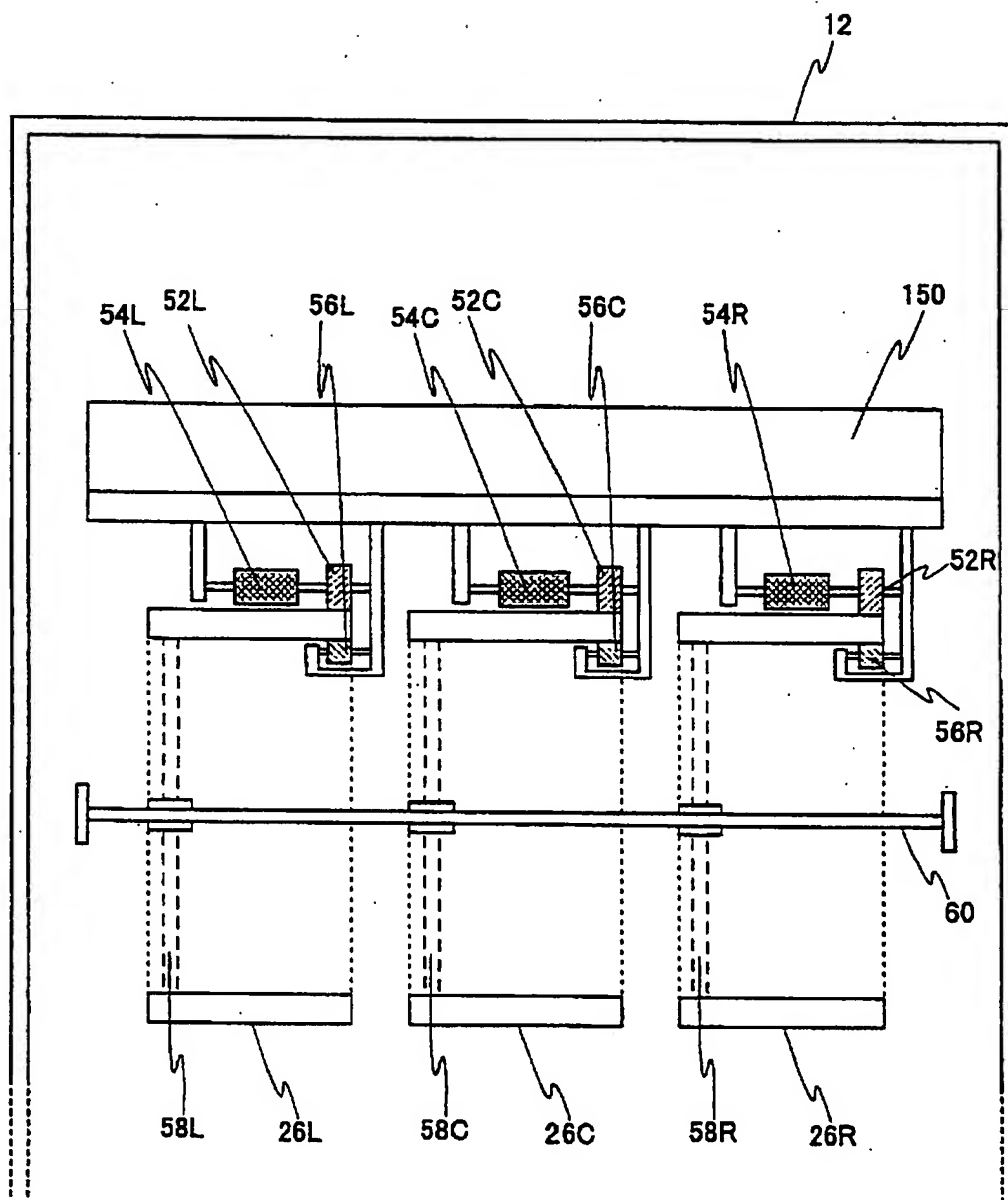
4/7

FIG.4



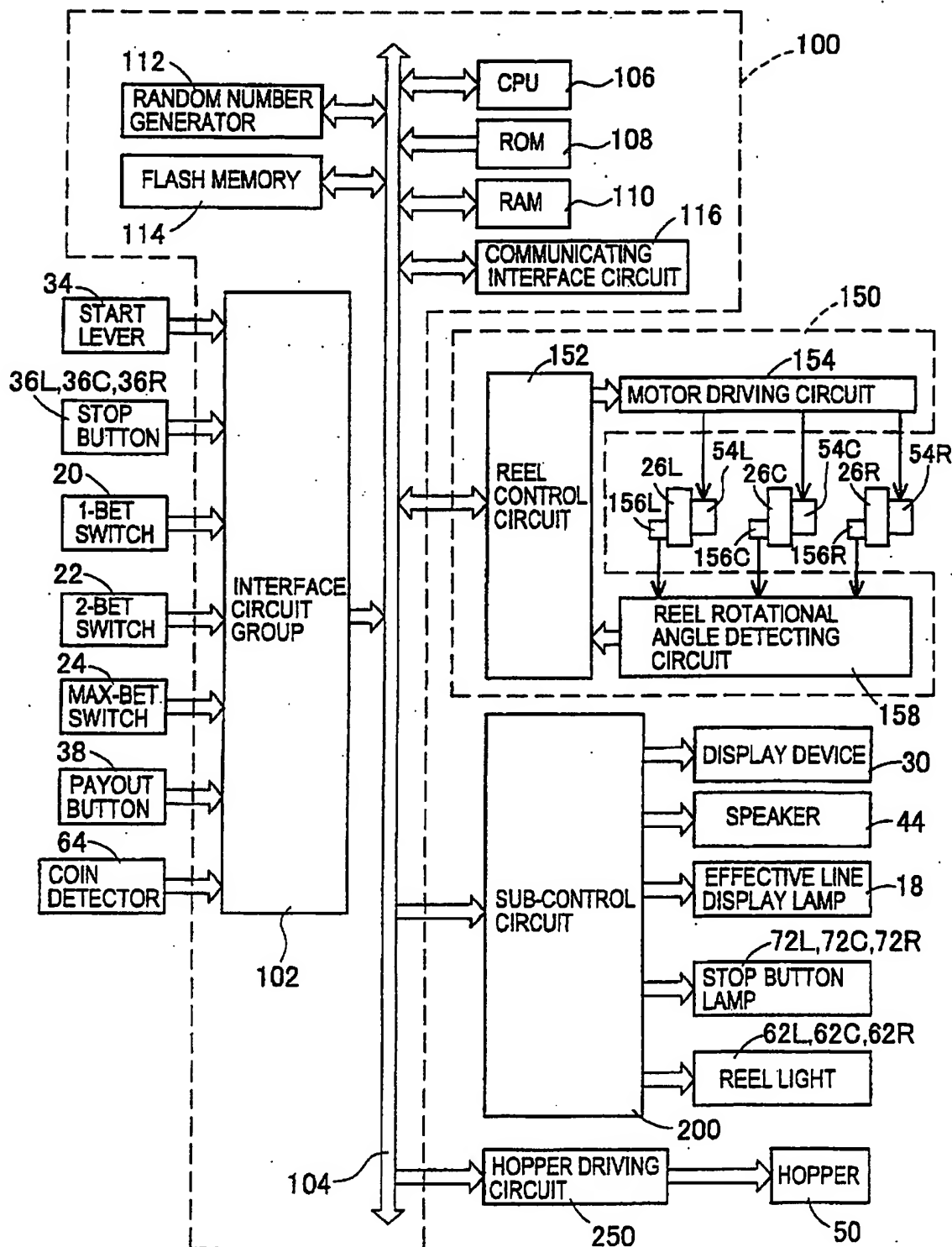
5/7

FIG.5



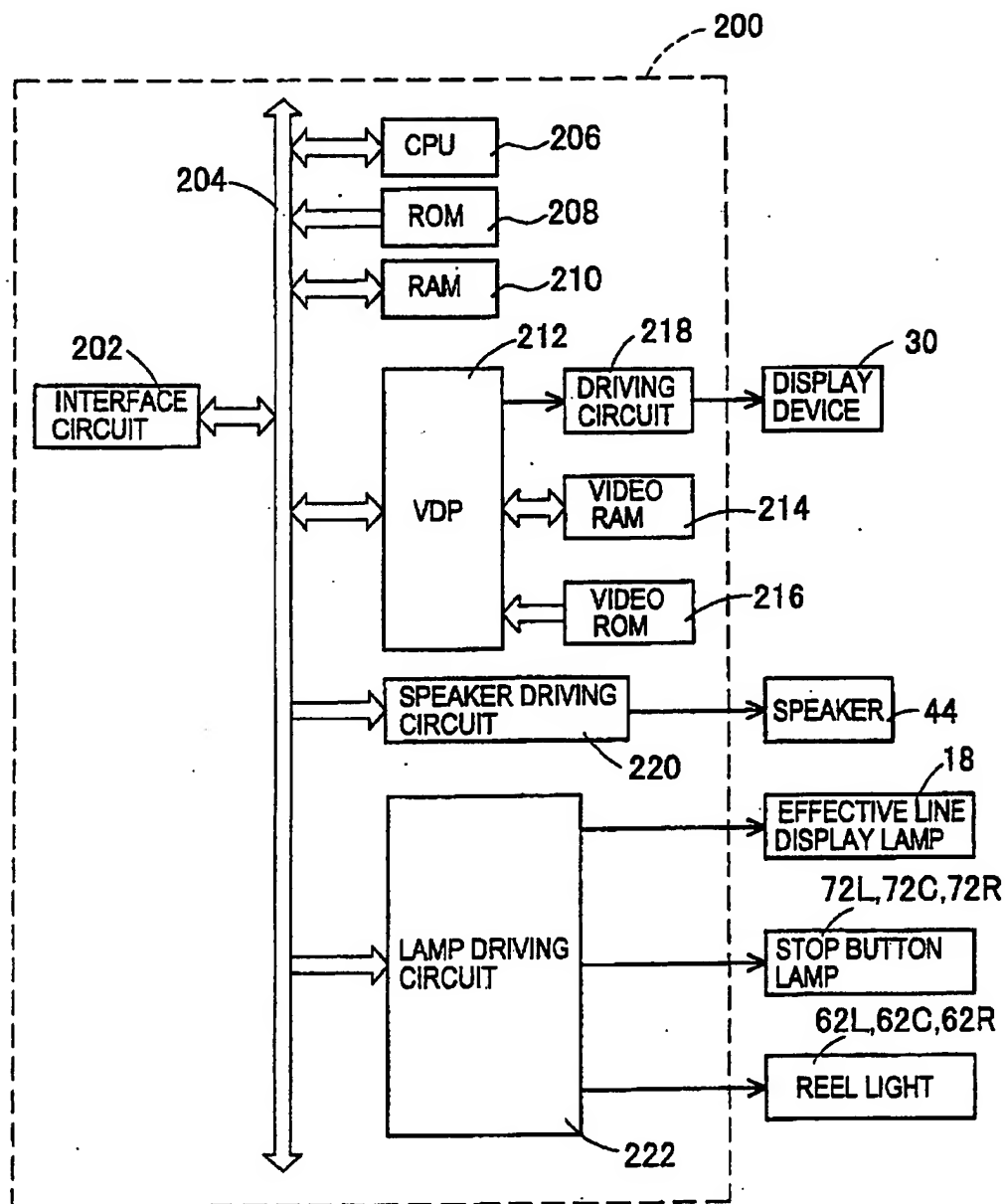
6/7

FIG.6



7/7

FIG.7



2003-003769

【Document Name】 Abstract of the Disclosure

【Abstract】

【Object】 To provide a gaming machine in which stop position of reels can be easily controlled and which has a construction that wiring in the gaming machine is simplified.

【Dissolving Means】 In the gaming machine 10 according to the present invention, the outer periphery portion of each of the reels 26 is held between the drive roller 52 and the following roller 56, and the reel 26 is directly driven by rotation of the drive roller 52, thereby stop position of the reel 26 can be easily controlled, and the stepping motors and the rotation control circuit board 150 are arranged in the upper position of the reels 26, thereby wiring in the gaming machine can be simplified.

【Selected Figure】 Fig. 4

2003-003769

PAST INFORMATION OF APPLICANT

Identification Number	[598098526]
1. Date of Amendment	July 23, 1998
[Reason of Amendment]	New Registration
Address	3-1-25, Ariake, Koto-ku, Tokyo
Name	ARUZE Corp.